

NON-PUBLIC?: N
ACCESSION #: 8911150265
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Quad Cities Unit Two PAGE: 1 OF 4

DOCKET NUMBER: 05000265

TITLE: Unit two Scram From Main Stop Valve Closure Due to Personnel Error

EVENT DATE: 10/12/89 LER #: 89-005-00 REPORT DATE: 11/04/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 4 POWER LEVEL: 055

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Bryan C. Hanson, Technical Staff Engineer
TELEPHONE: 309-654-2241

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On October 12, 1989, Quad Cities Unit Two was in the RUN mode at 55 percent of rated core thermal power. At 0140 hours, a reactor RCT! scram JC! occurred due to Turbine TRB! Stop Valve SHV! closure. This occurred when the station's Electrical Maintenance Department was removing a Limit Switch ZIS! from the number two Main Stop Valve SHV!(MSV). NRC notification was completed at 0227 hours to comply with 10CFR50.72(b)(2)(ii).

An investigation revealed that the cause for this event was personnel error. The Work Analyst, while developing the electrical work packages, overlooked the removal of two connections CON! on the MSV Limit Switch. This caused the number 1, 3, and 4 Turbine Main Stop Valves to close and subsequently the reactor scram.

The maintenance workers were immediately counseled. Further corrective actions will involve training, a procedure revision, issuance of an Operating Memo, and a training lesson plan revision.

This report is provided to satisfy 10CFR50.739a)(2)(iv).

END OF ABSTRACT

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PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: Unit Two Scram From Main Stop Valve Closure Due to Personnel Error

A. CONDITIONS PRIOR TO EVENT:

Unit: Two Event Date: October 12, 1989 Event Time: 0140
Reactor Mode: 4 Mode Name: RUN Power Level: 55%

This report was initiated by Deviation Report D-4-02-89-050.

RUN Mode (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

B. DESCRIPTION OF EVENT:

At 0140 hours, on October 12, 1989, Quad Cities Unit Two was in the RUN mode at 55 percent of rated core thermal power. The Electrical Maintenance Department (EMD) was in the process of removing the Limit Switch (SVOS-2)ZIS! on the number two Main Stop Valve (MSV)SHV! under Nuclear Work Request (NWR) Q78934. The limit switch was being removed as a result of problems identified on October 9, 1989, during a surveillance test. The EMD personnel removed four electrical leads CBL! on the limit switch that were identified in the work package. Two leads were still attached to the limit switch but were not identified in the work package. The limit switch was removed, and as a result, the number 1, 3, and 4 MSVs began slow closing. When the three MSVs reached the 10 percent closed position, a reactor RCT! scram JC! occurred due to Turbine

TRB! Stop Valve closure. The expected reactor water level transient due to the collapse of voids following the scram caused reactor vessel level to drop below +8 inches which caused Group II and III Primary Containment Isolations (PCI)JM!, Reactor Building Ventilation VA! and Control Room Ventilation VI! Isolation, and Standby Gas Treatment BH! initiation. Reactor water level was restored automatically by the Feedwater System JB! and a normal scram recovery proceeded. The Group II and III isolations were promptly reset. NRC notification using the Emergency Notification System (ENS) Phone System was completed at 0227 hours to comply with the requirements of 10CFR50.72(b)(2)(ii).

The investigation found that as the SVOV-2 limit switch for the number 2 MSV was being removed from the valve operator, the spring actuated limit switch arm released, as it was no longer being held in place with the valve stem. The actuating arm movement resulted in the KF 186 relay RLY! energizing due to the two remaining wires, TBD 12-4 and 12-5, being landed. The KF 186 relay is part of the electro-hydraulic control (EHC) HCU! system logic. The number 2 MSV is the master valve. When its position reached 10 percent closed, the SVOS-2 limit switch energized the XK16 and XK17 relays as designed, which in turn energized the closing solenoids SOL) for the 1, 3, and 4 MSVs.

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C. APPARENT CAUSE OF EVENT:

This event is being reported according to 10CFR50.73(a)(2)(iv), which requires the reporting of any event or condition that results in a manual or automatic actuation of an Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

The cause of this event is being attributed to personnel error. The EMD Work Analyst inadvertently overlooked the JF5 and JF6 connections on the limit switch in the preparation of the NWR instructions. The Work Analyst's oversight was a result of inattention to detail in reviewing the wiring diagram for the limit switch.

Contributing to this event was the inadequacy of the field verification of the wiring diagram performed by the EMD workers. The four wires that were identified on the drawing were verified on the limit switch, but the EMD workers did not discover the additional two wires until after the limit switch was removed. Limit switch SVOS-2 had 12 wires connected to it, with six of the

wires cut approximately one inch beyond the limit switch box and abandoned. The drawings showed all 12 wires as being terminated. The discrepancy with the drawing led to confusion, but the workers assumed the four marked wires on the drawing were the only wires that needed to be removed. Poor lighting, high temperature, and radiation concerns contributed to the workers' inadequate field verification.

D. SAFETY ANALYSIS OF EVENT:

The safety significance of this event is minimal. All expected ESF actuations occurred to bring the reactor to a safe shutdown condition. The Turbine Stop Valve scram occurs when the MSVs are less than 90 percent full open. This scram is intended to prevent exceeding the minimum critical power ratio (MCPR) safety limit by anticipating the rapid increase in pressure, neutron flux and heat flux which results from a fast closure of the turbine MSVs. If the Turbine Stop Valve scram had failed, the reactor scram would still have occurred from an Average Power Range Meter (APRM) High Neutron Flux scram. In this event, the MSVs operated at slow close, which further minimized the possibility of exceeding any limits.

E. CORRECTIVE ACTIONS:

Immediate corrective actions included counseling the EMD Work Analyst. Subsequent corrective actions will include training on this event, revisions to QAP 1500-2, guidance provided for contacting the Instrument Maintenance Department (IMD) when EHC Systems are involved, revisions to the training lesson plans, performing a wiring field verification on main turbine equipment, and an Operating Memo requiring power reduction when working on components effecting EHC circuitry.

The EMD Work Analyst was counseled by the Master Electrician following the event on the importance of reviewing electrical prints accurately and completely. The Master Electrician also stressed the significance of work detail included when developing work packages.

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QAP 1500-2 will be revised to clarify the requirements for verifying that the field conditions reflect the drawings when performing electrical work. This procedure change will enhance the development of NWR work instructions by providing clearer guidance for field verifications. Moreover, because of the IMD's greater involvement with the EHC System, QAP 1500-2 will require that when the NWR involves EHC components, the

IMD will be contacted for concurrence with the work steps to be performed (NTS 2652008905001).

All EMD and IMD Work Analysts will be trained on the QAP 1500-2 revision (NTS 2652008905002).

This event will be discussed with the members of the EM and IM Maintenance Departments with specific emphasis on ensuring that the drawings reflect the actual field conditions prior to performing any work (NTS 2652008905003). A training session will also be held with the Technical Staff personnel to discuss the lessons learned from this event (NTS 2652008905007).

The training lesson plans for Main Steam System and EHC System will be revised to enhance the description of the number two MSV (NTS 2652008905004).

The Electrical Maintenance Department will perform a wiring field verification on main turbine related equipment. This work is tentatively scheduled for the next refuel outage (NTS 2652008905005).

An Operating Memo will be written to require a reduction in power below the turbine scram setpoint when maintenance work is being performed on components that effect the EHC circuitry. Therefore, any turbine trip signal will result in only tripping the turbine and not a reactor scram and, thus, will lessen the impact of the transient on plant components (NTS 2652008905006).

F. PREVIOUS EVENTS:

There have been no previous occurrences at Quad Cities Station f a reactor scram being caused by unlifted leads due to personnel error since 1980.

G. COMPONENT FAILURE DATA:

There was no component failure associated with this event.

ATTACHMENT 1 TO 8911150265 PAGE 1 OF 1

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RLB-89-252

November 4, 1989

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Reference: Quad Cities Nuclear Power Station
Docket Number 50-265, DPR-30, Unit Two

Enclosed is Licensee Event Report (LER) 89-005, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv): The licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/MJB/ad

Enclosure

cc: R. Stols
R. Higgins
INPO Records Center
NRC Region III

*** END OF DOCUMENT ***
